Anthrax

1. DISEASE REPORTING

A. Purpose of Reporting and Surveillance

1. To rapidly detect anthrax-related illness and promptly treat those who are ill.
2. To promptly identify the source of infection, including identification of intentional release of anthrax in context of a bioterrorist attack.
3. To rapidly implement control measures.

B. Legal Reporting Requirements

1. Health care providers: **immediately notifiable to local health jurisdiction**
2. Hospitals: **immediately notifiable to local health jurisdiction**
3. Laboratories: **immediately notifiable to local health jurisdiction**; specimen submission required
4. Local health jursidictions: **immediately notifiable to the Washington State Department of Health (DOH) Communicable Disease Epidemiology Section (CDES).**

C. Local Health Jurisdiction Investigation Responsibilities

1. Facilitate the transport of specimens to the Washington State Public Health Laboratories if needed.
2. Determine the source of infection.
3. Identify other persons exposed and recommend chemoprophylaxis as indicated.
4. Report all confirmed cases to CDES. Complete the case report form (http://www.doh.wa.gov/notify/forms/anthrax.pdf) and enter the data into the Public Health Issues Management System (PHIMS).

2. THE DISEASE AND ITS EPIDEMIOLOGY

A. Etiologic Agent

Bacillus anthracis is an aerobic, non-motile, spore-forming, encapsulated, gram-positive, rod-shaped bacterium.

B. Description of Illness

Anthrax causes three main clinical syndromes, depending on the route of exposure.

1. Cutaneous anthrax (>95% of human anthrax)

Cutaneous disease is characterized by one or more painless, itchy papules or vesicles on the skin, typically on exposed areas such as the face, neck, forearms, or hands. Within 7–10 days of the initial lesion, the papule lesion forms a skin ulcer. The ulcer subsequently crusts over, forming a painless black eschar that is the hallmark of cutaneous anthrax. In addition, localized swelling, painful swollen regional lymph nodes, and systemic

symptoms can occur. Lesions can also form in the mouth or throat (oropharyngeal anthrax). The untreated case fatality rate is 5–20%; with appropriate therapy, death is rare.

2. Inhalational anthrax

Inhalational anthrax typically progresses through two distinct stages. The first, lasting from several hours to several days, involves influenza-like symptoms such as low grade fever, non-productive cough, malaise, fatigue and chest discomfort. The second stage involves abrupt onset of high fever, severe respiratory distress (dyspnea and hypoxia), and shock. A widened mediastinum is the classic chest x-ray finding. Therapy must be started early in the course of illness to be effective. Of 11 people who developed inhalational disease during the 2001 anthrax attacks, five (45%) died.

3. Gastrointestinal anthrax

Gastrointestinal anthrax is a rare form of the disease never documented in the United States. Symptoms begin with nausea, vomiting, and fever, then can progress to bloody diarrhea, bloody vomiting, acute abdomen, and sepsis. The case fatality rate is estimated to be 25–60%. While antibiotic use may decrease deaths, the nonspecific initial presentation makes diagnosis difficult in the absence of a known exposure or cluster of disease.

C. Anthrax in Washington

The last documented case of anthrax in Washington occurred in 1957. In 2001, processed *B. anthracis* spores put in letters caused an outbreak of 22 anthrax cases in the eastern United States.

D. Reservoir

Historically, anthrax has come from contact with herbivores (such as cattle, sheep, or goats) ill with the disease or from contaminated products (such as meat, wool, hides or hair) from ill herbivores. While dormant anthrax spores are found in the soil of many parts of the world including the United States, infection resulting from direct inhalation of natural spores in soil is felt to be very rare.

From a bioterrorism perspective, the main concern is specially processed spores which have a higher potential for causing infection, particularly inhalational anthrax. The extent of stockpiling of such weapons by nations and/or terrorist groups is unknown.

E. Modes of Transmission

Transmission can occur from skin contact with contaminated animals or animal products (e.g., wool or hides), eating contaminated food such as meat from an infected animal, or inhaling processed spores.

F. Incubation period

The incubation period is usually < 1 week but as long as 60 days for inhalational anthrax, 1–12 days for cutaneous anthrax, and 1–7 days for gastrointestinal anthrax.

G. Period of Communicability

Person-to-person spread is rare.

H. Treatment

Prompt administration of appropriate antibiotics is essential for effective treatment. For specific information regarding the treatment of cutaneous and inhalational anthrax see: http://emergency.cdc.gov/agent/anthrax/faq/treatment.asp

3. CASE DEFINITIONS

A. Clinical description

An illness with acute onset characterized by several distinct clinical forms, including the following:

- Cutaneous: a skin lesion evolving during a period of 2–6 days from a papule, through a vesicular stage, to a depressed black eschar
- Inhalation: a brief prodrome resembling a viral respiratory illness, followed by development of hypoxia and dyspnea, with radiographic evidence of mediastinal widening
- Intestinal: severe abdominal distress followed by fever and signs of septicemia
- Oropharyngeal: mucosal lesion in the oral cavity or oropharynx, cervical adenopathy and edema, and fever

B. Laboratory criteria for diagnosis

- Isolation of *Bacillus anthracis* from a clinical specimen, or
- Anthrax electrophoretic immunotransblot (EITB) reaction to the protective antigen and/or lethal factor bands in one or more serum samples obtained after onset of symptoms, or
- Demonstration of *B. anthracis* in a clinical specimen by immunofluorescence

C. Case classification (1996)

Confirmed: a clinically compatible case that is laboratory confirmed

4. DIAGNOSIS AND LABORATORY SERVICES

A. Laboratory Diagnosis

Clinical suspicion is the most critical element for accurate diagnosis. In the absence of trauma, a chest X-ray with mediastinal widening is suggestive of inhalational anthrax. A painless black eschar suggests cutaneous anthrax.

Laboratory tests available for the diagnosis of anthrax include gram stain and culture, electrophoretic immunotransblot (EITB) reaction, time-resolved fluorescent assay, real-time PCR, and EIA to detect IgG in acute and convalescent sera.

B. Tests Available at the Washington State Public Health Laboratories (PHL)

PHL will do culture, PCR, and time-resolved fluorescence testing. In addition, clinical laboratories can send suspect *Bacillus* cultures to PHL for species identification; such cultures are generally *B. megaterium*, another non-motile *Bacillus.* Contact PHL for shipping instructions.

C. Specimen Collection

For information regarding specimen collection, see:
http://emergency.cdc.gov/agent/anthrax/lab-testing/#specimen

All specimens should be submitted to PHL with a completed Reference Bacteriology form: http://www.doh.wa.gov/EHSPHL/PHL/Forms/ReferenceBacteriology.pdf

5. ROUTINE CASE INVESTIGATION

Immediately interview the case, suspect or confirmed, and others who may be able to provide pertinent information.

A. Evaluate the Diagnosis

Review the clinical presentation and laboratory findings. Facilitate the transport of specimens to Public Health Laboratories for confirmatory testing.

B. Identify Potential Sources of Infection

Treat any case of anthrax as a potential bioterrorism incident until this can be ruled out. Any resulting investigation is potentially both a public health and a criminal investigation. Local law enforcement or the FBI may be involved.

Ask about potential sources of transmission in the exposure period, including:

- Contact with animals or animal products
- Inhalation of dust from soil, grain or hay
- Occupational exposures
- Attendance at a large social gathering

C. Identify Potentially Exposed Persons

Once the route and likely venue of exposure have been established:

1. Determine the time and spatial extent of the exposure.
2. Develop a list of persons with suspected exposure based on interviews with ill persons as well as other evidence such as attendee lists or credit card receipts of any functions where exposure is suspected to have occurred.
3. Contact all potentially exposed persons to assess for illness and to discuss possible prophylaxis (see Section 6).

D. Environmental Measures

Consider directed environmental sampling of a suspect venue to localize the exposure.

6. CONTROLLING FURTHER SPREAD

A. Infection Control / Case Management

1. Hospitalized patients should be cared for using standard precautions.
2. Contact precautions should be used if uncontrolled drainage is occurring from a wound.

B. Contact Management

Contacts of the case are not generally considered at risk because person to person transmission is rare.

C. Management of Exposed Persons

Educate persons potentially exposed to the same source as the patient about the incubation period and symptoms of anthrax, including specific symptoms that should prompt immediate medical evaluation, such as: fever, cough, shortness of breath, vomiting, diarrhea, or appearance of a painless black scar on the skin.

For information regarding post-exposure prophylaxis for exposed individuals, see: http://emergency.cdc.gov/agent/anthrax/faq/preventive.asp

D. Environment Measures

Expert advice is needed for decontamination of processed spores in buildings.

7. MANAGING SPECIAL SITUATIONS

A. Response Following Discovery of a Suspicious Substance

1. Evaluation by Local Law Enforcement

Immediately call 911 if a suspicious substance (white powder or otherwise) is discovered. The initial key step is for law enforcement to assess whether or not a "credible threat" exists. They may call in a hazardous materials (haz-mat) team to assess the situation.

2. Public Health Response

If law enforcement concludes that there is a credible threat, additional laboratory tests should be performed at state or federal laboratories. Public health agencies may be involved with the ongoing investigation or prophylaxis of those exposed.

8. ROUTINE PREVENTION

A. Vaccine Recommendations

An inactivated cell-free vaccine exists and can be given as a six-dose series with annual boosters. It is currently recommended only for:

- Persons who work directly with the organism in the laboratory.
- Persons who work with imported animal hides or furs in areas where standards are insufficient to prevent exposure to anthrax spores.
- Persons who handle potentially infected animal products in high-incidence areas; while incidence is low in the United States, veterinarians who travel to work in other countries where incidence is higher should consider being vaccinated.
- Military personnel deployed to areas with high risk for exposure to the organism.

B. Prevention Recommendations

Recent cutaneous anthrax cases in the United States have been associated with untreated imported animal hides. Only processed animal hides should be used for products such as drums.

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UPDATES